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SCIENCE NEWS LETTER



®

THE WEEKLY SUMMARY OF CURRENT SCIENCE



Cancer Injection

See Page 127

A SCIENCE SERVICE PUBLICATION

PSYCHOLOGY

Viet Nam Police Tested

► THE NOISY rumpus that occurred when policemen in Viet Nam were introduced to an American-type intelligence test is reported in *American Psychologist* (Feb.) by Dr. Frederic R. Wickert, Michigan State University psychologist of East Lansing, Mich.

Dr. Wickert was one of a group from his university sent to Viet Nam to give technical aid to the government. His particular team was charged with helping to improve the internal security. In that connection, it was decided to start a police academy.

The need for a test arose in connection with selecting the best prospects for special police training at the academy. After consultation with Vietnamese officials it was decided to make a test partly of Vietnamese language items and partly arithmetic at the sixth-grade level.

Teachers were borrowed to help construct the test and school boys were borrowed to try the test for difficulty.

First difficulty was posed by the Vietnamese language. The whole language is in monosyllables with the more complex ideas expressed by stringing monosyllables together. It is basically a peasant's language, Dr. Wickert explains, and poor in abstractions. To express abstract ideas it is necessary to borrow heavily from Chinese. Men who would make good policemen could not be expected to do well on such Chinese-type words.

In addition, different dialects are used in North and in South Viet Nam. The

teachers who constructed the test were from the North, but the men who would take the test would understand only the dialect of the South.

Worst difficulty for administering a group test was the Vietnamese habit of "thinking out loud" while working problems and their custom of talking freely to each other while taking an examination.

When the big day arrived and 130 policemen turned up to take the test for admission to the new academy, it was necessary to split them into two groups. The first group was started with much supplementary instruction on not talking to each other. They seemed to understand and started to work quietly on the test. The examiners then went to the next room to start Group II.

"They had scarcely started," Dr. Wickert reports, "when the slight rumble from the direction of Group I increased to a roar.

"We rushed back only to find that they had gone back to thinking out loud, each one trying to outshout his neighbor."

Nevertheless, the test was a success and it was decided to return to routine duty the 26 men who received the lowest scores.

This decision raised a new problem. A number of persons, including both Vietnamese and Americans, objected to sending these men back. It was felt that they were the ones who most needed special training. Finally, it was worked out that the low men from four or five classes would be given special instruction fitted to them.

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important place in the nation's atomic energy program.

Ordinary iron is used as elongated, sub-microscopic particles. So fine is the iron dust, that there are more than a billion billion particles in one pound.

An important feature of the super magnet that is cobalt is not required in its manufacture. Cobalt is found in most all super magnets used in the past. The cobaltless magnet means that it can be utilized in nuclear reactors.

The development of T. O. Paine of the G. E. instrument division, the magnet is expected to find wide use in photo exposure meters and wherever permanent magnets are needed.

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MILITARY SCIENCE

Aircraft Company Rifle As Basic Weapon

► A SEVEN-POUND rifle that throws out lead at the rate of 750 shots per minute may become a basic U. S. infantry weapon.

The new weapon is called Armalite by its developer, Fairchild Engine and Airplane Corporation, and is the first such rifle to be produced by American industry in more than a decade.

Currently undergoing exhaustive tests by Army engineers, the lightweight, fast-firing rifle shows promise of replacing four weapons at once: the Browning Automatic Rifle (BAR), currently a backbone of the infantry squad arsenal; the carbine; the sub-machine gun; and the .45 caliber pistol.

In addition, it is the sole U. S. industry contender in the NATO arms race to find a light, rapid-fire weapon.

The new rifle emphasizes strictly the functional approach, light weight and mechanical and manufacturing simplicity "as might be expected of an aircraft industry's design," says Col. Melvin M. Johnson, Jr., an automatic weapons inventor and arms expert who test fired the Armalite.

Col. Johnson describes the new weapon, which can be fired single-shot or full automatic and from the shoulder or on a bipod, in *Army* (Feb.), the official publication of the Association of the U. S. Army.

Tabbed AR-10, Armalite is 40 inches long and together with its recoil compensator, weighs seven pounds. It takes rounds from an aluminum magazine that holds 20 short .30 caliber bullets. On full automatic, the 20-round clip can be emptied in 1.65 seconds.

Gas-operated, AR-10 is so designed that when it is loaded and locked the action is entirely closed against sand, dust, mud, rain and snow, Col. Johnson reports. He also says that the weapon can be disassembled easily.

As a modern rifle for a conventional type of small arms ammunition, Col. Johnson concludes, the Fairchild Armalite shows many interesting possibilities for hypermobile U. S. Army and other NATO military needs.

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PHYSICS

First Atomic Profits

► THE FIRST profits from the sale of the atom by American industry will come from abroad, Michael Michaelis of Arthur D. Little, Inc., Cambridge, Mass., told members of the American Management Association meeting in New York.

Foreign markets are the logical place for American industrialists to look for early profits from the sale of nuclear equipment and know-how, Mr. Michaelis told a special conference called, "Managing the Atom."

This is because atomic power will be used in competition with fossil fuels abroad sooner than it will in the United States. In this country, he pointed out, power is still plentiful and cheap when compared to atomic power at its present stage of development. The same is not true for many countries in the world, where fuel and power are both scarcer and more expensive than in the United States.

The commercial use of atomics, first abroad and then in the United States, Mr. Michaelis said, represents a tremendous market for nuclear equipment for U. S. firms.

The experience gained with foreign reactors and nuclear power, he pointed out, will speed the use of atomic energy for commercial purposes in this country.

Although there are many obstacles and problems to be worked out in the international commerce of the atom, Mr. Michaelis said, profits from exports of American nuclear equipment should tide over industry during the comparatively lean years anticipated in the home market for atoms.

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TECHNOLOGY

Super Magnet Made Of Iron Dust Developed

► A SUPER MAGNET made up of billions of tiny iron particles has been developed by General Electric scientists in Lynn, Mass.

The magnet, a result of molding invisible iron dust by powder metallurgy techniques, promises smaller, lighter and more rugged electrical instruments. It will also find an

PHYSICS

Fallout Hazard to Grow

The average content of strontium-90 in man is steadily increasing, and the averages for man on the five continents studied are strikingly similar.

► THE AMOUNT of cancer-causing strontium-90 in the bones of man will be 10 to 20 times greater by 1970 than it is today. But even with this increase, it will be far below the amount of the radioactive by-product of hydrogen and atomic explosions now considered to be the maximum permissible concentration for man.

This is the conclusion of the most comprehensive study of radioactive fallout and strontium-90 in man ever reported to the public. Based on the study of five continents, the report was written by Drs. J. Laurence Kulp, Arthur R. Schulert and Walter R. Eckelmann of the Lamont Geological Observatory, Columbia University, Palisades, N. Y., and published in the journal *Science* (Feb. 8).

Everytime an H- or A-bomb is set off in the world, debris made radioactive, and including strontium-90, is sucked up and dispersed in the air currents. Some of it falls back to earth very quickly. Much, however, depending on the size of the bomb and the type of detonation, is carried along in the stratosphere for years, gradually washing down on earth with rainfall.

The radioactive strontium-90 that falls on the earth has first an affinity for calcium in the earth's upper crust and secondly for calcium in man's bones. Plants take up the strontium-90, as well as cows eating the plants, and after a while, it is taken into the human body along with dinner and finds its way to bones, where it can cause cancer if in large enough amounts.

The problem studied by the Columbia scientists under a grant from the Atomic Energy Commission was to try and find out how much strontium-90 there is in humans throughout the world and what potential hazard it holds for mankind.

A careful analysis of bones of humans gathered from 12 countries led the research team to draw the following conclusions:

1. The present world-wide average content of strontium-90 in man is about 0.12 micromicrocuries per gram of calcium, or 1/10,000th of the presently accepted maximum permissible concentration.

2. The averages for the different continents are suprisingly similar, indicating that already the stratospheric drift of strontium-90 from megaton explosions is swamping the local concentrations from both the Nevada and Soviet test sites. (There is evidence, however, the report states, that Chile and Brazil have clearly lower concentrations than those localities in the Northern Hemisphere for which good sampling is available. Houston, Texas, and Bonn, Germany, were found to have similar concentrations.)

3. There is clearly an age effect, at least in the first 20 years. Young children have three to four times more strontium-90 per gram of calcium, on the average, than adults. This effect reflects the larger proportion of active bone in children.

4. As was expected, the average strontium-90 content of human bone does not vary from one locality to another more than the average concentration of mixed fission products.

5. An average of all samples from persons above 10 years of age showed that the concentration in Vancouver, B. C., was about the same as Houston, whereas the concentration in Denver is definitely lower.

6. There are large deviations from the mean in the strontium-90 content in individuals of a given locality. The average deviation for most 10-year-olds is about 50%. Some individuals in the United States may have at least 10 times the average concentration, which is thought to be related to diet.

The three scientists estimate that from ex-

plosions that have already occurred, the average human bone in the United States should contain about two micromicrocuries of strontium-90 per gram of calcium by 1970.

The world-wide average concentration will be lower, they predict, about 1.3. These figures are based on the fact that 50 megatons of fission have now been set off.

It would take 700 times this amount, or 35,000 megatons of fission released on the world, to bring the average concentration up to the maximum permissible concentration.

The most important problem, the scientists say, is the individual variation which must take into consideration the food sources in the diet.

At present, the scientists conclude, the world-wide average strontium-90 of man is 1/10,000th of that considered safe for his well-being.

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• RADIO

Saturday, March 2, 1957, 1:45-2:00 p.m., EST
"Adventures in Science" with Watson Davis, director of Science Service, over the CBS Radio Network. Check your local CBS station.

Dr. Eugene McDonald, director of Speech and Hearing Clinic, Pennsylvania State University, State College, Pa., and Dr. Harold Westlake, director of Speech and Hearing Clinic, Northwestern University, Evanston, Ill., will discuss "Speech Defects and Remedies."



HAMSTER AWAKES—Dr. Charles P. Lyman of Harvard University, who is studying the body mechanisms of hibernation, has been inducing hibernation and waking in a room where temperatures can be lowered to freezing or raised to the warmth of a summer's day. Although the hamster usually hibernates all winter, he rouses himself, winter or summer, when the temperature in his experimental room goes up.

SCIENTIA INTERNATIONAL

NOVAS DEL MENSE IN INTERLINGUA

► **Astronomia.**—Le plus grande radiotelescopio, con un diametro de circa 27 m, es in le Pais Basse. Le germanos ha un con un diametro de circa 25 m. Illo gerite per le Universitate Harvard ha un diametro de circa 20 m. Le Laboratorio Recercatori Naval del Status Unite erige un radiotelescopio a Maryland Point, Md., con un diametro de circa 28 m. Illo essera inaugurate in le curso del menses veniente. Le installationes pro le personal es parcialmente dupe proque le astronomos a Maryland Point va incluir un astronoma. In Anglaterra on prepara le construction de un radiotelescopio con un diametro de plus que 80 m. Illo essera preste in 1958.

► **Technologia.**—Un cellula de quarz, non plus grande que un arachide, promitte devenir un reemplacimento de efficacia superior pro le diaphragmas nunc in uso in radios e grammonophones. Un currente de alte voltage ionisa le aere in le cellula, rendente lo simile al ionosfera que involvava le terra a un altitude de 400 km. Variations del currente causa expansions e contractions del "nube" ionisata que se manifesta in modulabilissime undas acustic. Le nove altiparlator es la creation del Corporation DuKane de St. Charles in Illinois.

► **Recercas de Cancere.**—Duo leucemoide tipos de cancere in muses, ambe usque nunc irrelentabile per irradiação o chimotherapy e ergo semper letal, ha esiste completamente curate intra 30 dies per le injection intraperitoneal de sero ab normal porcos de India. Seros ab altere animales ha nulle effecto super le cancers mentionate, e nulle effecto es exercite per sero ab porcos de India super altere tipos de cancere. Ancora plus mysteriose es le facto que le effecto in question non se monstra in vitro. Il pare que le factor active in le sero require le presenta de un altere factor que existe in le muses. Le clarification de iste enigma va representar un importante passo in avante in le biochimia cancerose. Le recercas hic reportate esseva execute al Hospital New York.

► **Computatores.**—Le firma Arthur D. Little de Boston construe un computator electronic sin tubos a vacuo e sin transistores, resultante in un enorme economia de dimensiones. Le projecto es possibile gratis al invention del "cryotron" per Dr. D. A. Buck del Instituto Technologie of Massachusetts. Le cryotron es un rumpé-corrente que utilisa le principio que multe metallos perde quasi omne resistencia al currente electric quando illos es exponite a temperaturas in le vicinitate de zero absolute e que illos reacquire lor resistencia normal in despecto del basse temperatura quando illos suffre le effecto de un campo magnetic. Assi le cryotron es simplemente un curte pecia de filo metallic circumdate per un altere conductor de forma spiral. Le filo al centro es un conductor quando il ha nulle currente in le spiral circumdante lo. Le filo deventi un resistor quando un currente passa per le spiral.

► **Inventiones.**—Un matras que se face molle o dur secundo le gusto del usator esseva inventate per senior F. D. Arpin de Orange, N. J. Le matras ha un copertura hermetic intra le qual un vacuo pote esser producite per medio de un pumpa special. Alora le matras es dur. Per aperir un valvula on reduce le vacuo e rende le matras plus molle.

► **Physica Atomic.**—Importante disveloppamentos occure presentemente in le utilisation de energia atomic como propulsor naval. Le

Status Unite possede jam duo submarinos atomic. Dece-tres alteres es planeate. Le Marina Statounitese etiam ha planos pro un porta-aviones atomic de 85,000 tonnas. Multiple projectos de naves mercantil a propulsion atomic es sub consideration. Japon ha planos pro un petrolier submarine atomic de 30,000 tonnas. Russia ha sub construction un rumpe-glacis atomic de un displacimento de 16,000 tonnas. Le Marina Royal Britannic ha completate le planos pro su prime submarine atomic. Inter le prospectos futur del navigation atomic on mentiona naves de pesca que es simultaneamente fabricas flottante; naves de exploration petroleo-geologic que es flottante turres de foration; e naves amphibie sur- e submarin que pote immerger se pro evitare le inclemencias del tempore.

► **Osteologia.**—Un gruppo de scientistas de duo universitates in Colorado ha inaugurate un studio systematic del crescentia e recrescentia annual del cornos de cervos. In iste phenomeno il se tracta de un processo regeneratori de ossos que es unic in su intensitate. Si illo depende de un specific factor biochimic, on pote pensar al possibilite de inducer, per medios chimic, processos analogemente regenerative in ossos fracturare in patients human.

► **Antibioticos.**—Studies in progresso al Instituto Recercatori Walter Reed del Armea Statounitese a Washington supporta le theoria que antibioticos inhibe le crescentia de bacterios per obstruer le disveloppamento de lor pariete exterior. Isto pare esser le sol conclusion que pote esser deriveate ab le observation que (1) antibioticos se concentra in le pariete exterior del bacterios que illos attacca e (2) materiales normalmente usate in le disveloppamento del pariete exterior del bacterios se concentra inusata e apparentemente inusata a lor interior post que illos es attacate per antibioticos. On suppose que le construction del pariete require non solmente le mentionate materiales sed etiam le action de un enzima que es destruite per le antibioticos. Le proxime problema es evidentemente le identification del enzima (providite que illo existe). Su isolation e subsequente analyse aperirea le possibilite de synthetisar in le laboratorio substantias chimic que pote inhibir le enzima ancora plus efficacemente que le antibioticos e sin ulle effecto toxic super le organismo human.

► **Agricultura.**—Experimentos execute al Universitate Pennsylvania ha demonstrate que apes pote esser forteate a abandonar omne activitate per exponer los a sonos de un frequentia de 600 cyclos per secunda e un fortia de circa 120 decibels. Le discoperta es de evidente importancia practic pro le apicultor. Nunc ille pote inspicer su apicularios sin proteger se contra su amicas mellifere per involvapar se (e illas) in nubes de fumo de tabaco que postea debe esser eliminate per le plus meticulous ventilation. Le sonos producite per un simple vibrator es tanto efficace como le fumo tradicional—e multo plus nitide.

► **Technologia.**—Fornos solar non es de vital importancia practic in le Status Unite. Le pais es ancora troppo ric in altere ressources de energia thermic. Nonobstante, in le recercas del physica de alte temperaturas on se servi de plus in plus de fornos solar que produc un calor idealmente "pur," i.e. libre de omne produccion lateral de gases apte a complicar le labor del experimentator.

GENERAL SCIENCE

Reading Interlingua

► **YOU CAN READ** Interlingua if you had no more than one semester of high school French or Spanish or Latin and flunked it. You can read and understand a great deal of it even if you never had contact with any foreign language.

Send this page to an acquaintance abroad and tell him that he can get additional information about Interlingua from Alexander Gode, SCIENCE SERVICE's Interlingua Division, 80 E. 11th St., New York 3, N. Y.

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CHEMISTRY

Algae as Source of Fuel

► THE CAPTURE of the sun's energy and the production of fuel, methane gas, has been achieved by means of a special method of harvesting algae. The process, which is still in its early stages, is being investigated by University of California scientists in Berkeley as a possible new source of fuel. Methane is a basic component for the production of gasoline and other fuels.

Small amounts of methane have been produced in the university's engineering laboratory by controlling a series of natural processes involving the growth and decay of algae.

Algae store energy through photosynthesis. When they die, the algae are attacked by bacteria at the bottom of stagnant ponds. Decay and fermentation of the algae and other organic material on the pond bottom in the absence of oxygen produces methane.

The University of California scientists have simulated the pond conditions in the laboratory. They form a controlled, closed system with detention reservoirs and tubes. They use fluorescent lamps for the "sun."

The process is started with the introduction of a dilute mixture of sewage and concentrated pond algae. Periodically, the algae are put into a digester, where bacteria break them down to give gases, including methane, carbon dioxide, nitrogen and oxygen, plus organic sludge.

BIOCHEMISTRY

Chlorophyll Similar to Transistors in Radios

► THE FUNDAMENTAL CHLOROPHYLL material in photosynthesis, by which sun energy is stored by the green plant, seems to be a semiconductor, similar in several respects to the material used in making the transistors that are replacing electron tubes in radios and other electronic devices.

In the *Proceedings of the National Academy of Sciences* (Jan.), Drs. William Arnold and Helen K. Sherwood of the Oak Ridge National Laboratory's biology division report experiments that suggest the chloroplasts, or bits of chlorophyll, washed out of tobacco, spinach, beet and turnip leaves, and dried, act like semiconductors.

"If it is established that chloroplasts are semiconductors," they say, "then our ideas on the first step in photosynthesis may need some revision."

They suggest that photosynthesis has as much in common with solid-state physics as with the chemistry of solutions.

Dried chloroplasts and suspensions of Chlorella algae glow like inorganic crystals when light is shone on them and, when heated, the electrical resistance of dried chloroplasts shows changes that can be interpreted as the freeing of trapped electrons, such as happens in semiconductors.

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At present, the system is circular and continuous. The gases and sludge are fed back for algae growth.

If methane were piped off for fuel, carbon dioxide would have to be replaced. However, a set-up is visualized where methane might be burned in a power plant that is part of a whole system, allowing recovery of carbon dioxide. A continuous closed system on an industrial scale might some day be possible. The research, now in its fundamental stage, is being conducted by Drs. Clarence G. Golucke, biologist, and William J. Oswald, engineer, in collaboration with Dr. Harold B. Gotaas. A report of the scientists work has been made to *Applied Microbiology* (Jan.).

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CHEMISTRY

Tire Vulcanized by Atomic Radiation

► AN "ATOMIC TIRE," vulcanized by nuclear radiation, has been made in Idaho by scientists from the B. F. Goodrich Company in Akron.

The feat marks the first time atomic energy has been used successfully for vulcanization, the process for treating rubber

to improve its hardness, strength and other qualities.

The company's scientists reported the tire is the first large commercial item processed by nuclear radiation. Atomic vulcanization represents the first basic change in curing rubber since 1839. The tire is expected to wear longer and resist deterioration better than conventionally vulcanized tires.

Vulcanization normally involves adding sulfur and other chemicals to rubber, then heating it. This re-aligns the molecules to give the material stability.

Nuclear vulcanization was accomplished without using heat, sulfur or other chemicals. It resulted in a direct linkage of the carbon atom chains of the rubber molecules. Ordinarily, the carbon atom chains are linked through sulfur atoms, which are the weak link in regularly vulcanized rubber.

Scientists expect that, if nuclear energy becomes less expensive, tires could be vulcanized on a production basis "cold," much more rapidly than they are with today's 300-degree temperatures.

The vulcanization was done at the Atomic Energy Commission's National Reactor Testing Station in Idaho.

The tire, in a steel mold, was vulcanized by rotating it slowly over radioactive fuel elements taken from a nuclear reactor. The scientists worked out a complete mathematical model of the tire and radiation system before attempting vulcanization.

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NUCLEAR ENERGY VULCANIZATION—The first tire ever vulcanized by nuclear radiation is checked by B. F. Goodrich scientists at the National Reactor Testing Station in Idaho. The tire, encased in a steel mold, is slowly rotated over radioactive fuel elements in 17 feet of water which protects the scientists from radiation.

METEOROLOGY

Tornado Time Approaches

A sharp increase in the frequency of tornados in the United States usually occurs in March. These small storms swoop down causing heavy death and damage yearly.

By ANN EWING

► THE TORNADO season is approaching. Each year in March there is a sharp increase in the average number of tornados reported in the United States.

The figure jumps from six in February to 21 in March, and reaches a peak of 43 in May, closely followed by 40 in June.

These small but dangerous storms have whirling winds of tremendous speeds. Rotating funnel-shaped clouds swooping down from the base of thunderclouds cause an average of more than 200 deaths and damage estimated at \$21,000,000 each year.

Although the chances of a tornado striking any particular spot are extremely small, it is not possible to predict exactly where one will hit any more than it is possible to pinpoint where lightning will strike. However, it is possible to predict the general areas where conditions are ripe for tornado formation. For these regions, advance action can save lives, cut down property damage and reduce public alarm.

Warning Systems

Any town can organize a local tornado reporting and warning network, and many communities in Texas and nearby states have taken on the more ambitious project of underwriting a radar set, operated by the Weather Bureau, which is also part of a network.

Any kind of network, however, requires action by public-spirited citizens who will promptly report dangerous weather conditions to the nearest Weather Bureau office, police station or other local center.

A new kind of automatic warning system is being tested this year on a fairly wide scale. A sensitive device indicates by a red light and a buzzer when a "pressure jump," one indication of tornado-brewing weather conditions, occurs.

Conditions for Twister

Definite conditions are required to spawn a "twister," which is the reason certain regions, such as the country's mid-section, are much more frequently hit than other areas, such as the Northeast or Far West.

At the earth's surface, warm, humid and oppressive weather usually prevails, with winds often from a southerly direction. Above this damp, hot air, at around 10,000 feet, is a cooler air current, generally moving from west to east.

When this cool, dry air from the west

or northwest moves over the warm, moist surface air, accompanied by a narrow band of strong winds at intermediate levels, the stage is set for stormy weather.

Such an unstable atmosphere often results in a long line of thunderstorms, in which the tornado's spinning funnel is found embedded. Stretching for 100 miles or so and usually moving from west to east, this line is called a squall line. It is characterized by severe thunder, strong wind squalls and heavy rains, as well as considerable lightning.

Pressure Jump Line

This squall line is also known as a pressure jump line, because a sudden rise in barometric pressure always accompanies it. Since these pressure jump lines can occur without precipitation, a warning system to detect them would go even farther than radar in helping to spot regions where tornadoes are likely.

In the automatic network now being tested, about 100 of the buzzing devices have been set up 25 to 30 miles apart in Kansas, Missouri, Oklahoma and Texas. They are installed at police and fire stations, water plants and other places where people are normally on 24-hour duty and can telephone local Weather Bureau offices when the instrument sounds off.

This distance scale was chosen deliberately. Weather Bureau stations average about 200 miles apart, too far apart to catch every tornado. On the other hand, a trained meteorologist who might be able to see about five miles under good conditions, could not watch the formation, growth and death of a tornado.

The average width of the storm's destructive path is usually only a few hundred yards, and its length is only about 15 miles. During the half hour or so of its existence, a tornado swirls forward at 20 to 30 miles an hour. The winds that whip around its low pressure center have been estimated as up to 500 miles an hour.

Both the violent winds and the strong pressure differences over small areas account for the tornado's terrifying destructive powers. Buildings can be torn apart and the pieces shot through the air in a lethal barrage. Walls may collapse. The sudden reduction of pressure may have an explosive effect, sometimes moving heavy objects for considerable distances.

When the Weather Bureau issues tornado forecasts, they are meant to alert volunteer storm reporters, police and the public to watch for tornados if the sky becomes

threatening. Any necessary action required so that a place of safety can be reached quickly should be taken then.

When a tornado warning is issued, it means a tornado has been sighted. Warnings include the storm's location and direction of movement, so that safe shelter can be taken by those in the tornado's path.

Tornado Hints

A person actually seeing a tornado approaching should act swiftly.

The safest place to be during a "twister" is in a cave, storm cellar, or other underground excavation with an air outlet. If time does not permit this, lie flat in the nearest depression, such as a ditch or ravine in the open country.

Always try to move at right angles to the tornado's path.

In a city, seek inside shelter, preferably along the inside walls on the lower floors of a steel-reinforced building. It is wise to stay away from windows.

At home in a frame house, the southwest corner of the lowest floor, the basement if possible, offers the most safety.

People living in brick or stone houses should find other shelter, such as a storm cellar or the southwest corner of a frame house.

If time permits, turn off the gas and electricity.

The Weather Bureau points out that during the 41-year period from 1916 through 1956, the total number of deaths caused by tornados was less than one-fourth the number of fatalities, 40,200, reported by the National Safety Council as the result of automobile accidents in the single year 1956.

Worst Tornado

Damage-wise, the most outstanding tornado since 1900 was the storm that hit central and eastern Massachusetts on the afternoon of June 9, 1953. It took 90 lives and injured 1,288 and the estimated property damage was \$52,000,000.

In number of lives lost, 689, the tornados that hit Missouri, Illinois and Indiana on the afternoon of March 18, 1925, were the deadliest since 1900. Property damage was estimated at \$16,500,000, and 1,980 people were injured in that storm.

Tornados can occur at any hour of the day or night, but they are most likely to form following the warmest hours of the day, 43% occurring between the hours of three and seven p.m. Of all known tornados, 82% have hit between noon and midnight.

The individual hours of four to five p.m. and five to six p.m. are those during which the greatest number have been reported.



TORNADO'S TERRIFYING FUNNEL—Why tornadoes are aptly named "twisters" is strikingly shown in this photograph taken on the afternoon of June 27, 1955, when the funnel-shaped tornado cloud was four and a half miles away.

These two hours account for 23% of the storms.

Tornado forecasts for the entire United States are prepared at the Weather Bureau's Severe Local Storm Forecasting Center in Kansas City. Specialists there analyze and interpret a large number of weather charts and diagrams to spot any areas in the country where tornado formation is likely.

Their forecasts are coordinated with district offices, and are distributed to the public by radio and television stations in or near the threatened areas up to six hours in advance.

MEDICINE

Need "Trauma" Hospitals

► TRAUMA hospitals, to train young surgeons in the treatment of injuries, are needed throughout the country, Dr. Michael L. Mason, professor of surgery at Northwestern University Medical School, proposes.

Injuries that cause open wounds have assumed increasing interest and importance. Accidents take about 100,000 lives every year, cause up to 500,000 severe injuries, and probably total close to 10,000,000 injuries in the aggregate. Fortunately, most injuries are trivial and lead to little or no disability, particularly if a few basic principles of care are followed in their management.

But Dr. Mason feels that the warnings about the need for preparation to handle mass casualties, whether they come from

the various tornado studies and experiments being made by the Weather Bureau, by universities and by research organizations are aimed at a better understanding of the conditions under which "twisters" are brewed and how they grow, with the aim of improved forecasting, thus helping to save lives and cut down property damage.

Within a few years, the Weather Bureau plans to have about 100 radars operating, blanketing the country with a network for spotting any severe storms, particularly hurricanes and tornadoes.

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nuclear warfare or civilian disasters, have not been heeded.

"The important thing is that we become trauma conscious," he believes.

"If some of the diseases for which special campaigns have been set up caused one-tenth the mortality, misery, financial loss and disability that trauma does, or if we were threatened with an epidemic one-thousandth as serious as nuclear warfare, the country would go hysterical in campaigns to eradicate the disease and to train doctors in its management," Dr. Mason said.

Fortunately, more and more hospital training is being given in the treatment of wounds, the surgeon said, and the old system whereby the emergency room is staffed

by the youngest and least experienced members of the hospital staff is changing.

But still, Dr. Mason finds that trauma has been dignified by honorable status in only a few of the country's large centers and teaching hospitals.

Dr. Mason reports on the need for trauma hospitals and other new approaches to the treatment of open wounds in the *Bulletin of the American College of Surgeons* (Jan.-Feb.).

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CHEMISTRY

New Magnesium Alloy Means Faster Planes

► A NEW alloy that promises to give airplanes and missiles a greater kick was reported. It is a combination of magnesium and thorium.

Undergoing extensive tests by its developers, the Dow Chemical Company, Midland, Mich., the alloy has already proved that it can better withstand high temperatures than any aluminum or magnesium alloy being used today. The Air Research and Development Command in Baltimore, Md., for whom the new alloy was made, says that use of the alloy may make it possible for Air Force planes and missiles to go faster and farther.

The metal was subjected to a temperature of 700 degrees Fahrenheit for 100 hours and there was no change in its tensile strength, yield strength or elongation properties. Tabbed HM 21XA-T8, the new alloy is 30% lighter than aluminum alloys.

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MEDICINE

Pulling on Infants Causes Bone Injury

► PULLING a child's arm to keep him from falling can cause an injury that may be mistaken for scurvy, bone infection, or even a malignant tumor of the bone, Dr. Morris S. Friedman, South Bend, Ind., told the American Academy of Orthopaedic Surgeons meeting in Chicago.

The injury may be nothing more than a self-correcting inflammation of the periosteum, the membrane that covers the bone. Infants and young children have a much more loosely attached periosteum which can be stripped off more easily than an adult's can, Dr. Friedman reported.

The injury can occur without being suspected and can even result from a strong pull exerted on the infant's legs during the birth process.

Even light injuries can cause internal bleeding in the membrane. This is followed by new bone formation which sometimes looks like a faint fracture line in an X-ray picture, the physician reported.

The problem will clear up by itself within a few weeks and should not be confused with more serious conditions, he said.

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MEDICINE

Crossed Eyes Can Lead To Juvenile Delinquency

► CROSSED eyes can lead to juvenile delinquency, truancy and eventually to criminal acts, Dr. Elbyrne G. Gill, director of the Gill Clinic, Roanoke, Va., told the regional meeting of the International College of Surgeons in White Sulphur Springs, W. Va.

"A child with crossed eyes will drop out of school because he is made the object of jokes by his fellow schoolmates. He develops an inferiority complex, a psychic trauma," Dr. Gill said.

Crossed eyes usually come on gradually and are rarely noticed before a child is 18 months old. They become more noticeable after the child is four or five years old.

Many parents are advised by friends not to do anything about crossed eyes as the child will outgrow the condition.

"This is a great mistake," he warned. "The only thing we ever outgrow is our clothes."

The earlier the eyes are straightened, the better, he added, saying that treatment should be started as soon as the deformity is apparent, regardless of age.

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PSYCHOLOGY

Why Brain Surgery Relieves Drug Addicts

► WHEN drug addiction has its origin in intolerable pain, the synthetic drugs usually utilized to relieve the distressing withdrawal symptoms are ineffective. In this case, brain surgery has been found effective.

The operation known as lobotomy, cutting of the connections between the frontal lobes and other parts of the brain, relieves not only the withdrawal symptoms but also the intolerable pain.

A theory to account for why the surgery is effective in this way is reported in the *Psychological Bulletin* (Jan.) by Dr. James A. Spingarn of the Naval Medical Field Research Laboratory, Camp Lejeune, N. C.

Drug addiction, and also withdrawal symptoms, have two aspects, he points out. In addition to the physiological component (the body's demand for the drug), there is also a psychological component, or craving. Lobotomy immediately relieves the psychological component of drug addiction, but it does not affect the physiological aspect unless withdrawal of the drug is delayed for something like a week after the operation.

A similar dichotomy is observed in connection with pain and the effects of the brain operation in relieving it. The complaining of patients usually stops after the brain operation. And yet, upon questioning, nearly all admit that the pain is still present, unabated, in spite of the fact that they are able for the most part to ignore it.

After brain surgery, therefore, the physio-

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logical pain remains, but the psychological interpretation of it as "intolerable" is removed.

To explain the action, Dr. Spingarn draws on an old conception, a defense mechanism known to psychologists as "denial."

Some mental patients are euphoric, or "high," because they deny the obvious and very real causes for anxiety in their lives.

In "brain damage," Dr. Spingarn explains, "whether it is caused by morphine addiction, electric shock, or lobotomy, denial is exaggerated and may, in fact, become the sole psychological crutch in persons so disposed."

To the extent that drugs or surgery can induce either temporary or permanent brain damage, they may substitute for one another in aiding the use of denial of whatever physiological or psychological stress may be present.

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BIOCHEMISTRY

Sulfa-like Drugs Promise Diabetic Relief From Shots

► THE SULFONYLUREA DRUGS that promise to replace diabetic insulin shots with a pill for some sufferers are stimulating a wave of new diabetes research.

The latest results of human and animal research on the sulfa-like compounds that can lower the level of sugar in the blood are being shared by a group of world experts in diabetes meeting in New York for a conference on the drugs sponsored by the New York Academy of Sciences.

The development of insulin in 1921 gave diabetics a successful treatment for their disease, but the insulin always has to be taken by injection. The search for a pill that could replace these regular injections has been going on since then, but until now there has been no sure substitute. Pills of insulin itself have failed because the substance is destroyed by gastric juices if taken by mouth.

The newest development is a chemical called tolbutamide and trade-named Orinase. It is a chemical relative of the sulfa drugs, but unlike them it does not kill bacteria or produce the usual sulfa side reactions.

"The sulfonylureas are under clinical and laboratory investigation for their efficacy in the control of diabetes and depending upon the results achieved will be considered for general use," Dr. Rachmiel Levine, Michael Reese Hospital, Chicago, told the conference.

Present evidence bears out his theory that the new compounds act by stimulating the body's production of insulin in the pancreas, Dr. A. L. Loubatieres, Institut de Biologie, Montpellier, France, reported.

Dr. Loubatieres was the first scientist to recognize the similarity of action between a sulfa drug known as 2254 RP and insulin back in 1942.

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IN SCIENCE

PSYCHIATRY

"Patient Governments" Of Mentally Ill Effective

► "PATIENT GOVERNMENTS" are proving useful in the treatment of mental illness in 30 Veterans Administration hospitals, Dr. S. T. Ginsberg, chief of the psychiatry division at VA central office in Washington, reports.

The patient governments are organized in two different ways. In the first type, patients on a ward elect several of their members as a council to represent the ward in joint meetings with the hospital staff.

In the second type, an overall group is organized along the lines of a community citizens' association, with a constitution and by-laws. Periodic meetings are presided over by elected officers.

Patient governments help the hospital administration by improving procedures and relationships between patients and the staff.

The main effect, however, Dr. Ginsberg reports, is to give patients opportunities for initiative and self-expression and for assuming responsibility for themselves and their fellow man. This helps in their recovery.

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GENERAL SCIENCE

Atom Industry Does Not Offer "Quick Dollar"

► THE NUCLEAR power industry in this country is no rags-to-riches business, an American Management Association conference on "Managing the Atom," was warned in New York.

High profits and a quick return are not likely to be found in the infant industry of atomics, Carroll L. Wilson, president of the Metals and Controls Corporation and a former general manager of the Atomic Energy Commission, said.

Progress will be slow, he explained, because atomic power plants will be experimental, costly and uneconomic for some time to come.

Mr. Wilson cautioned the industrialists that development in the field of atomic power will be completely dependent on the Government.

The whole advance of nuclear power, he said, depends heavily upon the will of the Government and unless the Government continues to finance the costly prototypes of new power reactors, progress will be slow. Experimental reactors are too expensive for private industry to finance, he pointed out, adding that only the Government can foot the bill for reactor experiments that cost up to \$30,000,000 each.

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SCIENCE FIELDS

MEDICINE

Industrial Noise Is Tough Problem to Doctors

► THE EFFECTS of noise are becoming a serious problem to industry, workers and physicians, Dr. C. Stewart Nash, University of Rochester School of Medicine and Dentistry, Rochester, N. Y., told a regional meeting of the International College of Surgeons in White Sulphur Springs, W. Va.

The problem is who is responsible for hearing losses that occur among workers.

Occasionally a worker becomes fatigued or irritable if the noise around him is too great, but he may also become hard of hearing if exposed to a clatter that is too intense for the ear to withstand, Dr. Nash said.

The physician dealing with industrial deafness is faced with conflicting forces, he added.

Dr. Nash is sometimes asked to testify for a worker that his hearing "loss" was caused by plant noise and is permanent in nature. Industry, on the other hand, while wanting to compensate employees who actually are deafened, wants the ear specialist to rule out disabilities that happened years ago, Dr. Nash reported.

A third party, the insurance company, wants to distinguish between a temporary hearing loss and a permanent one, the physician added.

"In efforts to make the best of a bad situation, labor, industry, workmen's compensation boards, industrial commissions and underwriters are constantly jockeying for positions advantageous to their own points of view," he said.

But progress in reducing damaging plant noise is being made as a result of studies of the types and intensities of noise that can and do produce occupational deafness, he concluded.

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MEDICINE

Tranquillizers Endanger Emotional Health

► TRANQUILIZING drugs can endanger your emotional health as well as your physical health, Drs. Herman A. Dickel and Henry H. Dixon, department of psychiatry, University of Oregon Medical School, Portland, warn in the *Journal of the American Medical Association* (Feb. 9).

The psychiatrists studied the effects of the drugs in 8,200 patients suffering from anxiety and found that some became depressed enough to commit suicide, some suffered severe toxic reactions, and many others experienced serious emotional problems.

Many normal people who go to their physician for advice or counsel about mildly distressing problems get a "perhaps too casual" examination and evaluation and a prescription for a new tranquilizer, they reported.

"The patients returned to complain of unpleasant, unwanted responses, often emotional, to the drugs, and the physicians misinterpreted the responses as meaning a more 'deeply seated' illness was present. They so stated to the patients and precipitated a serious reaction," the psychiatrists reported.

In the present philosophy of freedom from anxiety, there is a "malignant tendency" forcing us to believe that no one should ever be afraid or so moved about his position in life that he does something about it, they said.

Instead, we are to be completely tranquil under all circumstances and let someone else "do the worrying," try to get ahead or be successful.

Many of the individuals the psychiatrists saw were not able to handle the conflicts and tensions of life without the tranquilizers but the majority of them were using the drugs and becoming valueless to themselves and to the group in which they worked, they said.

"Finally, the modern medical philosophy must continue to be that basically man is better off having to fare for himself—that being too well cared for, having too little fear from cradle to crypt is not healthy and that all drugs are still only a small and essential part of medical practice, certainly no cure-all for modern trouble to be dispensed indiscriminately without sound medical advice," they concluded.

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PHYSIOLOGY

Brain Stroke Condition Not Found in Animals

► NEW facts about why humans suffer more brain strokes than animals have been reported by Dr. W. E. Stehbens, University of Sydney, Australia, in *Nature* (Feb. 9).

Dr. Stehbens has found that animals have the same defects in the walls of their brain arteries that give rise to dangerous stroke-causing aneurysms in man. But in animals, the aneurysms themselves are rarely found.

These defects occur in the arteries, at the point where they divide into two branches, and have been considered by some to be the main cause of the aneurysms or sac of blood which forms in the weakened area. When these aneurysms burst from too much pressure, they can cause paralysis and death by disrupting the flow of blood to vital brain tissue.

A study of the brain arteries of dogs, horses, and sheep has shown that these defective walls occur quite frequently in animals as well as man, Dr. Stehbens reported.

These findings indicate that defective walls are not the only cause of the dangerous blood pockets in man, he reported.

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EDUCATION

To Survey Universities' Overseas Activities

► WHAT do American universities do overseas? The Carnegie Corporation of New York has made a grant of more than a quarter of a million dollars to Michigan State University to find out.

The grant will enable the Michigan researchers to appraise the wide variety of programs in all parts of the world in which U. S. universities are active, including the technical assistance programs sponsored by the federal government.

Grants, totaling more than \$1,000,000 were made by the Corporation for studies in the international field. Others of the grants include money to Columbia University to enable 40 Russian area experts to make short trips to the Soviet Union; a study of the role, purpose and performance of ROTC programs, to be done at Dartmouth College, Hanover, N. H., and a grant to the Common Council for American Unity to translate into Hungarian its handbook for immigrants, which is called "Life in America."

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CHEMISTRY

Watered Down, Reheated Minerals "Fluoresce"

► THE FACT that some minerals turn bluish-green under ultraviolet or "black light," when they are watered down and reheated, might prove to be a new tool for studying the surface of solids.

A description of how a large number of colorless inorganic solids fluoresce because they had adsorbed water is reported in *Nature* (Feb. 9), by K. Przibram of the Institut für Radiumforschung, Vienna, Austria.

Calling the phenomenon fluorescence, reversible by annealing, Mr. Przibram points out that the colorful fluorescence does not appear after the samples have been heated strongly for a short time, but it returns when they are either kept for months exposed to the air or when they are wetted.

"Rather surprisingly," the Austrian scientist says, "the fluorescence is also regenerated when the strongly heated samples are heated again to a less degree."

This he calls the reversibility of fluorescence by annealing and thinks that when the colorless minerals are first heated strongly, water is driven out, driving out with it the possibility of fluorescence.

During cooling in open air, water vapor condenses on the surface. When excited by renewed heating, the water molecules are bound more strongly to the surface and this state is fluorescent.

Reversible fluorescence, Mr. Przibram says, with more and varied study, might shed some ordinary light on the adsorption of vapors on solid surfaces and on the structure of solids.

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ASTRONOMY

Jupiter Shines All Night

Spring comes for the Northern Hemisphere as the sun crosses the equator on March 20 while it marks the first day of autumn for the Southern Hemisphere.

By JAMES STOKLEY

► THE PLANET JUPITER, which contains enough material to make 318 earths, is the most prominent star or planet now visible.

On St. Patrick's day it will be directly opposite the sun, which means that it will be visible all night, rising at sunset and setting as the sun rises. It is now in the constellation of Virgo, the virgin, whose evening position is shown on the accompanying maps.

These depict the sky as it looks about 10:00 p.m., your own variety of standard time, on March 1. By the middle of the month, it will look this way at nine o'clock, while at the end of March the eight o'clock appearance is indicated. Virgo is seen toward the east.

Jupiter is now of magnitude minus 2 on the astronomical scale, or more than half again as bright as Sirius, the brightest star, and it is easy to locate. Also in Virgo is the first magnitude star called Spica, which is so close to the horizon on March evenings that its light is greatly reduced.

Above Virgo stands Leo, the lion, with the bright star Regulus. This orb, with a semicircle of stars just above, forms a little figure known as the Sickle. Regulus marks the end of the handle, which points downward.

Winter Constellations Going

With winter now approaching its end, the constellations that characterize that season are getting ready to bow off the celestial stage.

They are seen in the southwest, instead of being high in the south, as they were a month or two ago. The most familiar, perhaps, is Orion, the warrior. Three stars in a row form his belt, while Betelgeuse is above and Rigel below.

Just to the right is Taurus, the bull, with Aldebaran. Above Orion we find Gemini, the twins, with Castor and Pollux, the latter a star of the first magnitude.

Going from Rigel toward the left, one comes to Canis Major, the greater dog, in which Sirius shines. Above this group, after passing the faint figure of Monoceros, the unicorn, stands the lesser dog, Canis Minor, with the star called Procyon.

Swinging around toward the northern sky, Auriga, the charioteer, can be located to the right of Taurus, with the star Capella. High in the northeast is the familiar figure of the great dipper, which is really

part of Ursa Major, the great bear. In the bowl of the dipper are the two stars known as the pointers.

A line through them, downward and to the left at present, takes you to Polaris, the pole star, which always marks the north, since it stands directly over the north pole. The handle of the dipper also is a pointer, for by following its curve toward the east one comes to Arcturus, in Bootes, the bear-driver, tenth and last of the first magnitude stars seen on March evenings.

Sun Over Equator

One welcome astronomical event occurs on the afternoon of March 20, for on that date (at 4:17 p.m., EST), the sun will stand directly over the equator. Since December it has been moving northward in the sky, and now it reaches the half-way point of its journey.

It rises directly east, and sets directly west, so day and night are of equal length. Hence the name of this event, the "equinox," which means "equal nights."

In the Northern Hemisphere this is the beginning of spring, but in the Southern Hemisphere it is the first day of autumn. While the sun during the winter was so low for us, it was high for them, and they could enjoy the warm weather of summer.

With Orion and his neighbors now descending into the west, and Leo and Virgo just coming up in the east, the center of the celestial stage, i.e., the part of the sky directly south, is occupied by a number of interesting but less conspicuous constellations. One of these, Monoceros, has already been mentioned as standing between the two dogs, Canis Major and Canis Minor. The brightest star in it is of the fourth magnitude, so it is not conspicuous.

In earlier times this part of the sky seems to have been left blank, but apparently Monoceros was added in the 16th century, when there was a revival of interest in astronomy.

Next to Monoceros, toward the left, is Hydra, the water-snake, considerably more conspicuous, since its brightest star is of the second magnitude. This is called Alphard and it is shown on our maps as the fourth star from the bottom.

Supposedly, it represents the heart of the reptile, while the little group of four stars at the upper end form the head. Actually the constellation continues farther to the south, even below the four stars shown of Corvus, the crow, but these are so dimmed by their low altitude that they are not bright enough to be shown on our map.

Corvus is another of the smaller constellations, but it goes back to ancient times. The Romans called it a crow while the Greeks regarded it as a raven, which is a member of the same family as the crow.

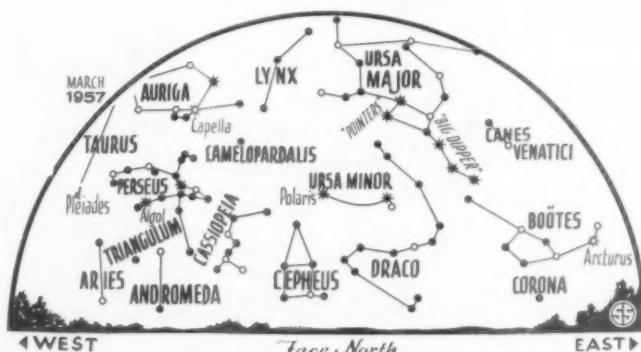
Quite low in the south, just left of Canis Major, are shown a few stars, marked Pyxis, Vela and Puppis. Actually these are all part of a much larger group, containing some very prominent stars, but they are so far south that they do not appear above our horizon. This is Argo Navis, the ship Argo, supposed to represent the mythological vessel that Glaucus built for Jason, who led the Argonauts in their quest of the Golden Fleece.

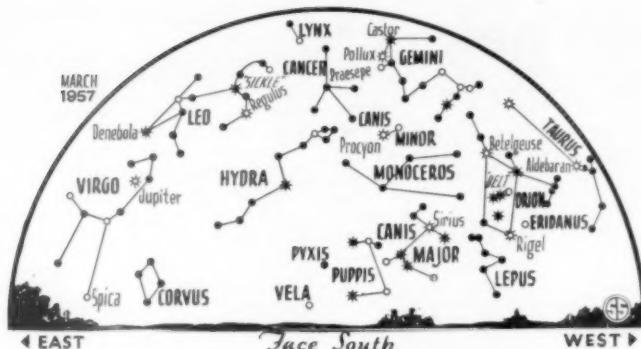
Argo Has Four Parts

The group is so big that it is subdivided into four parts, each considered as a constellation. Puppis is the "poop," or stern; Vela the sail and Pyxis the compass. The fourth, Carina, the keel, is not shown. It is farther south and contains the brilliant star called Canopus.

In the southern states of the United States it comes into view, but not for points that are north of 38 degrees latitude.

High in the south is Cancer, the crab,





* * * SYMBOLS FOR STARS IN ORDER OF BRIGHTNESS

which does not contain any first magnitude stars, but it can hardly be called an unimportant constellation. It is one of the 12 that mark the zodiac, the band through which the sun, moon and planets all seem to move.

Praesepe or the Manger

In this group, on a dark clear night, one can see a faint misty light that has sometimes been mistaken for a comet. Actually this is a naked-eye star cluster, a great aggregation of distant suns, known as Praesepe. It is sometimes called the Manger, and two donkeys, represented by stars nearby, are supposed to be feeding from it.

Early in the 16th century, when he was making the first telescopic observations of the skies, Galileo looked at Praesepe and counted 40 stars, thus proving that there were stars which could not be seen by the naked eye.

Modern powerful telescopes reveal several hundred or more in this little group.

ZOOLOGY

Dog, Bear Ancestor Same

► THE ANCESTRY of man's best friend, the dog, can be traced back some 40,000,000 years to a common ancestor of bear and dog, Miacis, Dr. Edwin H. Colbert of the American Museum of Natural History reports in a new Museum publication in New York.

Miacis, who was built somewhat like a dachshund with a long body and short legs, was not very different in appearance from some of the modern East Indian or African civets.

Miacis lived during the transition from the Eocene to the Oligocene period of geologic history. Those were the days when horses were no larger than small sheep and had three toes on each foot. Rhinoceroses were still small horse-like running animals, quite hornless and probably completely lacking in the ferocity that so distinguishes their modern descendants. The first ancestors of apes and man were, in those days, small tree-dwelling monkeys, Dr. Colbert says.

Celestial Time Table for March

MARCH EST

1	11:12 a.m.	New moon.
7	8:25 a.m.	Moon passes Mars.
9	6:50 a.m.	Moon in first quarter.
12	2:30 a.m.	Algol (variable star in Perseus) at minimum brightness.
14	5:00 p.m.	Moon nearest, distance 223,100 miles.
	11:19 p.m.	Algol at minimum.
15	9:22 p.m.	Full moon.
16	4:07 a.m.	Moon passes Jupiter.
17	1:00 p.m.	Jupiter in opposite direction from sun and nearest earth, distance 413,400,000 miles.
	8:08 p.m.	Algol at minimum.
20	1:00 p.m.	Mercury behind sun.
	4:17 p.m.	Vernal equinox (beginning of spring in Northern Hemisphere).
21	1:23 p.m.	Moon passes Saturn.
23	12:04 a.m.	Moon in last quarter.
26	11:00 p.m.	Moon farthest, distance 252,100 miles.
31	4:19 a.m.	New moon.

Subtract one hour for CST, two hours for MST, and three for PST.

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During the Oligocene period the first canids evolved in North America as direct descendants of Miacis. There were two types. One of these later evolved into a heavy animal with a lumbering walk—the bear. The other was the ancestor of the dogs, wolves, and foxes.

The descendants had increasingly longer legs adapting them especially for fleet running after prey.

Almost from the beginning, the true dog was a runner. And he was among the most intelligent of the warm-blooded animals. In addition, early in the history of the dog's development, this animal displayed a "social intelligence," learning to act together as a group to run down a fleet victim and to hunt in packs.

And there are well authenticated records, Dr. Colbert reports, of wolves supplying food for an infirm and aged member of the pack.

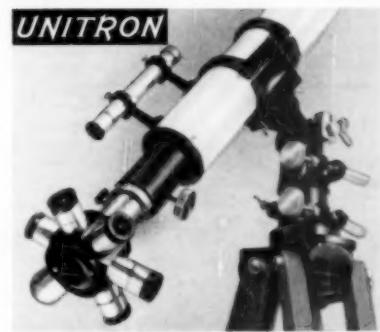
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Books of the Week

For the editorial information of our readers, books received for review since last week's issue are listed. For convenient purchase of any U. S. book in print, send a remittance to cover retail price (postage will be paid) to Book Department, Science Service, 1719 N. Street, N. W., Washington 6, D. C. Request free publications direct from publisher, not from Science Service.

AIR POLLUTION HANDBOOK—Paul L. Magill, Francis R. Holden and Charles Ackley, Eds. and Frederick G. Sawyer, Ed. Consultant—*McGraw-Hill*, 720 p., illus., \$15.00. Providing basic source material on the many aspects of air pollution.

BASIC FACTS AND FIGURES: International Statistics Relating to Education, Culture and Mass Communication, 1956—*UNESCO*, 96 p., paper, \$1.00. For the world population as a whole, it is estimated that at least two out of every five adult persons are still unable to read and write. Most of these illiterates live in Africa.

THE CONSERVATION DIRECTORY: A Listing of Organizations and Officials Concerned with the Protection of Wildlife and Other Natural Resources—Stewart M. Brandborg, Compiler—*National Wildlife Federation*, 96 p., paper, 40 cents.

GAMES FOR THE NOT-SO-YOUNG—Sid G. Hedges—*Philosophical Library*, 107 p., illus., \$2.75. This book will help the sick or lonely person pass the time and will also liven up gatherings of adults.

GLOSSARY OF PEDOLOGIC (SOILS) AND LAND-TERM TERMINOLOGY FOR SOIL ENGINEERS—James H. McLellan—*Highway Research Board*, Special Report 25, 32 p., illus., paper, 80 cents.

THE GMELIN HANDBOOK OF INORGANIC CHEMISTRY: Calcium, Part B1—Gerhart Hantke and others—*Verlag Chemie (Walter Johnson)*, 264 p., illus., \$34.99. Covering the technology and compounds of this element and therefore of interest to industrial chemists.

THE GMELIN HANDBOOK OF INORGANIC CHEMISTRY: Copper, Part A1—Erich Franke and

others—*Verlag Chemie (Walter Johnson)*, 710 p., illus., paper, \$92.13. The major part is devoted to the metallurgy of copper.

THE GMELIN HANDBOOK OF INORGANIC CHEMISTRY: Copper, Part A2—Matthias Atterer and others—*Verlag Chemie (Walter Johnson)*, 755 p., illus., paper, \$100.20. This volume covers the physical and mechanical properties, the chemical behavior and physiological hazards.

THE GMELIN HANDBOOK OF INORGANIC CHEMISTRY: Thorium and Isotopes—Matthias Atterer and others—*Verlag Chemie (Walter Johnson)*, 406 p., illus., \$55.22. Besides thorium this volume covers radioactinium, radiothorium, ionium, uranium Y and uranium X.

A GUIDE TO QUALITATIVE ORGANIC CHEMICAL ANALYSIS—R. P. Linstead and B. C. L. Weedon—*Academic*, 169 p., illus., \$4.50. A text of British origin intended for first and second year students but useful also to postgraduates and research workers.

A HISTORY OF THE ANCIENT SOUTHWEST—Harold Sterling Gladwin—*Bond Wheelwright*, 383 p., illus., \$8.50. From pieces and bits of artifacts left by ancient peoples, the author has constructed a history of those who lived in America's Southwest.

IF YOUR CHILD HAS RHEUMATIC FEVER—*American Heart Association*, 19 p., illus., paper, single copies free upon request direct to publisher, 44 East 23d St., New York 10, N. Y. A booklet for parents on various aspects of prevention and care of rheumatic fever and rheumatic heart disease.

AN INTRODUCTION TO JUNCTION TRANSISTOR THEORY—R. D. Middlebrook—*Wiley*, 296 p., illus., \$8.50. Presenting to engineers the knowledge of theory they need to appreciate the potentialities of this new device.

THE LIFE OF ARTHUR STANLEY EDDINGTON—A. Vibert Douglas—*Thomas Nelson*, 207 p., illus., \$6.25. Biography of a great physicist written by one of his former research associates.

MAGNETOHYDRODYNAMICS—T. G. Cowling—*Interscience*, 115 p., illus., paper \$1.75, cloth \$3.50. When the author began writing this book, main applications of magnetohydrodynamics were to geophysical or astronomical problems. Now its engineering aspects are being recognized.

MEETING PREHISTORIC MAN—G. H. R. Von Koenigswald, translated by Michael Bullock—*Harper*, 216 p., illus., \$3.50. The author himself made many of the original finds of the remains of early man or pre-man. In this autobiography

he shares with the reader the excitement of his discoveries.

MODERN INTRODUCTORY PHYSICS—Ira M. Freeman—*McGraw-Hill*, 2d ed., 497 p., illus., \$6.00. Intended for undergraduates whose major is not science, so no previous study of physics or other science is required.

THE NEW WORLD OF THE ATOM—James Stokley—*Ives Washburn*, 288 p., illus., \$5.50. Providing basic information for the layman.

1956 TECHNICAL MANUAL AND YEAR BOOK OF THE AMERICAN ASSOCIATION OF TEXTILE CHEMISTS AND COLORISTS: VOLUME XXXII—William H. Cady, Ed.—*House for the Association*, 626 p., illus., \$6.00. Technical information for those in the industry and a directory of names and addresses.

NO ROOM FOR WILD ANIMALS—Bernhard Grzimek—*Norton*, 271 p., illus., \$3.95. The director of the Frankfort Zoo tells with lively humor of his adventures in the Belgian Congo photographing wild animals, and presents arguments for saving wild animals from extinction.

THE O.S.S. AND I—William J. Morgan—*Norton*, 281 p., illus., \$3.75. A psychologist writes of his exciting experiences in that "cloak-and-dagger" organization known as O.S.S.

THE ORNITHOLOGISTS' GUIDE—H. P. W. Hutson—*Philosophical Library*, 275 p., illus., \$10.00. A guide for bird watchers intended to be useful internationally.

PIONEER EDUCATOR IN THE AIR AGE—*New York University*, 60 p., illus., paper, free upon request direct to publisher, Office of Information Services, University Heights 53, N. Y. A booklet commemorating the 30th anniversary of the Guggenheim School of Aeronautics at N.Y.U. Two years prior to the historic Lindbergh transatlantic flight Alexander Klemin suggested founding this school.

PSYCHOLOGICAL RESEARCH—Benton J. Underwood—*Appleton-Century-Crofts*, 298 p., \$4.00. Intended to prepare students to use scientific methods in research in psychology.

QUALITY CONTROL FOR PLASTICS ENGINEERS—Lawrence M. Debing, Ed.—*Reinhold*, 142 p., illus., \$4.95. An introduction to the subject prepared for engineers and manufacturers.

RETARDED CHILDREN CAN BE HELPED—Cornell Capa and Maya Pines—*Channel Press*, 160 p., illus., \$5.00. Describing what communities, parents, schools and interested volunteers can do to make useful and happy lives for those who start under a handicap.

SCIENCE IN THE FEDERAL GOVERNMENT: A History of Policies and Activities to 1940—A. Hunter Dupree—*Harvard University Press*, 460 p., \$7.50. Tracing Government concern with scientific investigation and advance from the days of Washington and Jefferson.

THIS IS GLASS—*Corning Glass Works*, 64 p., illus., paper, free upon request direct to publisher, Corning, N. Y. Describing the manufacturing methods, applications and uses of glass, and reporting its history.

THE TRUE BOOK OF REPTILES—Lois Ballard with pictures by Irma Wilde—*Children's Press*, 47 p., illus., \$2.00. To most children, reptiles are not repulsive as they are to many adults. Young readers will probably find charming this book about snakes, turtles, lizards and others of their kin.

WHAT'S HAPPENING IN SCHOOL INTEGRATION?—Harold C. Fleming and John Constable—*Public Affairs Committee*, Public Affairs Pamphlet No. 244, 20 p., illus., paper, 25 cents. A map of the southern states shows which states are integrating, which resisting and which defiant. A survey shows that desegregation is actually going forward even in the deep south.



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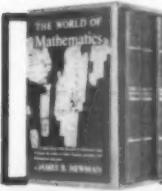
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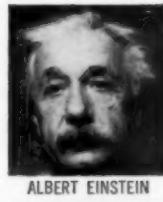
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Questions

BIOCHEMISTRY - Pills of what drug promise to replace diabetic insulin shots? p. 120.

CHEMISTRY - Algae have been found to serve as the source of what fuel? p. 117.

METEOROLOGY - What conditions are required to spawn a tornado? p. 118.

PHYSICS - Why do children have more strontium-90 per gram of calcium in their bones than adults? p. 115.

PSYCHOLOGY - What was the main difficulty found in giving an intelligence test to Viet Nam police? p. 114.

ZOOLOGY - The dog and what other animal have a common ancestor? p. 123.

Photographs - Cover, Medical News; p. 115, Harvard University; p. 117, B. F. Goodrich Co.; p. 119, Mrs. Marvin Thompson; p. 128, Avco, Mfg. Corp.

Do You Know?

Language specialists have prepared a method of teaching a practical elementary vocabulary of 200 words to migrants during the short period of a month or so before they leave their home country and during the journey.

About 365 eggs per person will be consumed in 1957.

Average per capita consumption of fluid milk in the U. S. is a trifle over three-fourths of a pint per day.

An outbreak of foot-and-mouth-disease has been reported in the vicinity of Salonica in northern Greece.

Uses foreseen for solar engines are house-heating, electric power generation and process heat for industrial plants.

Leaf juice extracts of fruit trees to be tested for virus diseases are inoculated into the cotyledons, or seed leaves, of the cucumber; virus symptoms appearing on the cucumber plants show presence of the disease in the leaf juice.

An eight-ton shipment of French perfume with a retail value of \$6,000,000 was included in freight aboard an airplane.

A thin, protective aluminum "skin" only one-fourtieth as thick as the average skin on the human body, has been placed on copper wire to increase the life, reduce size and raise efficiency of present-day electrical equipment.

MEDICINE

Give Inmates Cancer Cells

See Front Cover

► THE THIRD part of a study to discover the effects of live cancer cells injected into healthy human beings has begun at the Ohio State Penitentiary, Columbus, Ohio, the Sloan-Kettering Institute reported in New York.

The human guinea pigs are all prisoners who volunteered for research aimed at finding the relationship between natural defense mechanisms and cancer in man. It is being done by the Sloan-Kettering Institute and the Ohio State University College of Medicine.

On the cover of this week's SCIENCE NEWS LETTER Dr. Chester M. Southam is shown injecting live cancer cells into a prison volunteer.

Of the latest group of 53 volunteers, 11 are volunteers for the third time, 15 for the second time, and 27 for the first time.

The first part of the study, begun in May, 1956, showed that healthy volunteers have some kind of natural immunity to the cancer implants which caused them to be vigorously rejected. But volunteer patients who already had cancer did not have this

immunity, and the cancers were able to continue growing.

In the second part of the study, the healthy volunteers were given another inoculation of the same type cancer cells that they had received before. This was to determine if their natural immunity had been increased. The results are being evaluated.

In the present part of the study, the inmate volunteers who participated previously will receive implants of cancer cells of a type different from those they received earlier. This is to determine whether or not these individuals will react differently to another type of cancer cell.

Seven types of human cancer cells have been used. All were removed from cancer patients several years ago and have grown since then in laboratory media.

Principal investigators in the study are Drs. Chester M. Southam and Alice E. Moore of Sloan-Kettering Institute, and Dr. Charles A. Doan of Ohio State University College of Medicine, with the cooperation of the Ohio Division of Correction and Warden Ralph W. Alvis and Dr. Richard H. Brooks of the Ohio Penitentiary.

Science News Letter, February 23, 1957

are additional to 40 winners announced previously.

The students given honorable mentions go to school in 177 communities, located in 41 states and the District of Columbia. They were chosen from among 20,145 entrants, 3,122 of whom completed the science aptitude examination, submitted recommendations and scholarship records and wrote reports on their scientific experiments.

Of the 260 outstanding seniors in the list, 55 are girls and 205 are boys, the ratio being determined by the number of girls and boys who completed entries.

All 300 selected for honors will be recommended for scholarship awards by the nation's colleges and universities.

Students in the honorable mentions list rank high in their high school graduating classes: 156 of the boys and 50 of the girls ranked in the top five percent in their high school classes.

Those given honorable mentions without exception participated in extracurricular activities. Science clubs have attracted 213 of these students. Of the honorable mentions, 149 have had experience in local, regional, state or national science fairs.

Fifty-seven of the boys and four of the girls named physics as their first choice for future careers. Engineering is the first choice of 50 boys and one girl. A total of 39 boys and girls want to become chemists. Medicine is the chosen career of 34, including 11 girls. Nine girls prefer to become science or mathematics teachers.

Science News Letter, February 23, 1957

PHYSICS

Space Travel

► SPACE TRAVEL, long considered exclusively the subject of science fiction, is seen a step closer with the Air Force announcement it is investigating ion beams for space ship propulsion. If this method is perfected, it would greatly decrease the time required for travel between planets.

An answer concerning the feasibility of the ion beam method of space propulsion is expected within five years, the Air Force's Office of Scientific Research reported. The "pure research" contracts are for about \$20,000.

Einstein's theory of special relativity predicts that a pocket watch carried by a fast-moving space traveler will tick fewer times than a similar clock on earth. The slowdown would also apply to his heart-beat, thus the space ship inhabitant would not age as fast as the stay-at-home.

A controversy concerning whether this would actually happen is being waged by American and British scientists in the staid pages of the British scientific journal, *Nature*. (See SNL, Jan. 19, p. 36.) Most scientists agree the space traveler would return physiologically younger than the non-traveler.

They also agree that it is not possible to travel as fast or faster than the speed of light, 186,000 miles per second. So-called "photon rockets," propelled by beams of light, could theoretically approach this speed.

"It is impossible for any material object to travel with the speed of light," Dr. Peter Bergmann of Syracuse University told SCIENCE SERVICE. Dr. Bergmann is one of the world's top authorities on Einstein's relativity theory.

Any speed short of 186,000 miles per second, he said, is theoretically possible, although there is now no known method to accelerate objects having very much mass to velocities anywhere near that speed.

At 99% of light's speed, Dr. Bergmann calculated that a returning space traveler "would have aged about one-seventh as fast" as an earthbound twin. If the space ship he journeyed in weighed 20 tons, it would weigh 140 tons at 99% of light's speed.

Dr. S. F. Singer, physics professor at the University of Maryland, said that the time a space ship takes to turn around would be a "substantial fraction" of the entire journey.

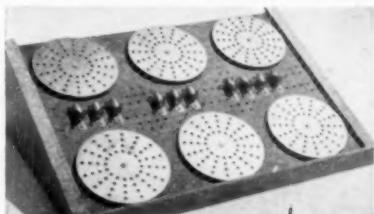
Science News Letter, February 23, 1957

GENERAL SCIENCE

Honorable Mentions in Search Announced

► HONORABLE mentions in the Sixteenth Annual Science Talent Search have been announced by Watson Davis, director of SCIENCE SERVICE. These 260 additional high school students selected for national honors

Can you think faster than this Machine?



Control Panel of GENIAC set up to do a problem in check valve research.

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• **MICROSCOPE ATTACHMENT** permits viewing and photographing transparent and semi-transparent specimens with a three-dimensional effect. The device can be used with standard microscopes and with still cameras from 35mm to large view size and motion picture cameras of any size.

Science News Letter, February 23, 1957

• **FOCUSING PISTOL-GRIP** on a telephoto lens mount keeps near-by or distant scenes on target. The pistol-grip connects with a spiral-loaded lens mount instead of the standard focusing ring. It is available with 240mm f4.5 lens; 300mm f5.6 and 400mm f5.6 lenses.

Science News Letter, February 23, 1957

• **ANGLE HEAD ATTACHMENT** for power drills converts one-half inch tools for drilling, sanding and polishing. The two-speed angle head swivels to any position in a full circle. Operating at low or high speed, it will fit any one-half inch drill having a one-half inch by 20 threaded spindle.

Science News Letter, February 23, 1957

• **MOBILE RADIO TRANSMITTER** and receiver set, shown in the photograph, designed for military and commercial use, has a 30-mile range. Transistorized, the set



weighs eight pounds, and operates while immersed in water. The set works from a rechargeable battery for ten continuous hours. A hand crank is also provided for emergency use.

Science News Letter, February 23, 1957

• **TRANSISTOR CIRCUITS KIT** for beginners and experimenters in radio and electronics include two transistors, all parts and plug-in leads. With the kit, 10 different electronic circuits can be made. An instruction manual and guide cards are included.

Science News Letter, February 23, 1957

• **BUILDING COATING** provides protection against chemical and weather exposure. Based on a chlorosulfonated polyethylene, the coating is said to form a tough, resilient face that resists abrasion, weathering and chemical corrosion, even salt spray.

Science News Letter, February 23, 1957

• **PICTURE SCALER** for cropping photographs eliminates slide rules, computations and drawing diagonals. The scaler is set to proportion and enlarges or reduces automatically. It is made of translucent vinyl plastic, steel and aluminum.

Science News Letter, February 23, 1957

• **TIP-PROOF SCALE** can be used for recipes, home freezing, canning, checking meat roasting time or laundry loads. The weigher has a measurement chart and dial lock to hold weight in calibration for later reading. It can be stored on its side.

Science News Letter, February 23, 1957



Nature Ramblings



By HORACE LOFTIN

• YOU MAY NOT realize it from the weather, but Old Man Winter is on his way out. Spring is just around the corner, and you can tell because every day the sun shines just a little bit longer. Before long the seven o'clock risers will shave by pleasant sunlight instead of the glow of an electric light bulb.

Soon the trees will put forth new shoots, early-blossoming flowers will appear, and the birds will return north from their winter homes. The sun will call forth all these things.

But just a minute. The temperature is relatively constant in the tropics. How do the birds wintering down there know things are warming up back-home? What triggers off their spring flights northward?

Look for the sun again for an answer. It is not necessarily the amount of heat received from the sun at the change of seasons that acts as the trigger. The length

Commanded by the Sun



of daylight—the hours of day as opposed to the hours of night—has been proven in many cases to be the signal for a change in the pace of life. Experiments have shown that changes in the length of daylight of only 15 minutes have resulted in the start of migration in several species of birds.

We can look to the length of day as the trigger mechanism behind other seasonal phenomena of life: molting, ovulation, seasonal fattening and growth in animals;

spring awakening, flowering, fruiting and dormancy in plants.

The first clear-cut recognition of the effect of varying length of day—photoperiodicity—under laboratory conditions came in 1920, with the discovery that a tobacco variety, Maryland Mammoth, would not flower until the days had grown shorter. By putting the tobacco plants in a greenhouse and artificially shortening their daily exposure to light, the tobacco was forced to bloom much earlier than it would in nature.

From that start, the effect of varying length of daylight has been investigated on a host of plants and animals. "Short-day" plants, like sugar cane, were found that will not flower until the daily dose of sunlight is decreased. "Long-day" plants, like wheat, need more sunlight for flowering. But then there are the "day-neutrals" that seem to remain independent of the length of sunlight for flowering—showing that all the answers are far from being in yet.

Science News Letter, February 23, 1957